

2010.04.22

## BB30 Troubleshooting and Installation Tips

**Specification: BB30 Cranksets and Bottom Brackets**

The BB30 standard is rapidly becoming common in the marketplace as it is adopted by more and more bike manufacturers. At first glance BB30 looks very simple, but its smooth operation relies heavily on tight BB shell tolerances and precise installation. Many issues with BB30 systems are the result of shell diameter inconsistencies or mis-alignment of the bearings. FSA offers a hand cutter tool to dealers and frame builders to ream the BB30 shell bearing seats to the correct tolerance and professional quality installation tools to guarantee proper bearing alignment.

BB30 is an open standard available to the public for viewing. The technical drawings with dimensions and tolerances are available at [www.bb30standard.com](http://www.bb30standard.com).

This service bulletin is designed to help technicians troubleshoot BB30 bottom brackets and crank installation. Refer to installation instructions found at [www.fullspeedahead.com](http://www.fullspeedahead.com) for detailed tool use, crankset and BB30 bottom bracket instructions.

### Tools for the Job

**Removal/ Installation of BB30 Bearings:** FSA makes both professional level and consumer level installation and removal tools. The professional level tools are made with hardened steel to withstand repeated use often found in service shops, whereas the consumer tools are designed for less frequent, periodic maintenance of the bicycle.

**Note: Bearing Removal:** Never remove the BB30 bearings using a hammer and punch. Removing the bearings using this method can skew the bearing sideways in the frame and damage BB30 frame tolerance.

Professional BB30 Bearing  
Installation Tool #EE037



Consumer Level BB30 Bearing  
Installation Tool #EE041



Professional BB30 Bearing  
Removal Tool #EE038



Consumer Level BB30 Bearing  
Removal Tool #E0019



**Frame Tolerance/ Alignment:** FSA has produced two gauges to quickly and accurately check the BB30 shells for proper Inner Diameter (ID) and proper alignment of the bearing seats. These machined ground, hardened steel gauges are expensive to produce. Generally high capacity frame manufacturers will have these tools, but they are available to anyone who would like to purchase them; small builders, bike shops, or consumers highly enthusiastic about tools.

BB30 Shell ID (inner diameter) Gauge #E0171



BB30 Bearing Seat Alignment Gauge #EE036



At minimum, Service Departments or Home Mechanics can use High Quality Digital Calipers for BB30 Shell ID Inspection



**BB30 Shell Reaming:** When the bottom bracket shell on a BB30 frame is slightly undersized, or has burrs or other material inhibiting bearing installation, there is a reaming tool available that will trim the inner diameter of the shell to the proper specification. The FSA reaming tool ONLY works with the Park HTR1 or HTR1B handle and requires the Park #750 cone (available from wherever Park Tools are sold). It is highly recommended that dealers who regularly sell and service bicycles with BB30 cranksets purchase the BB30 shell reaming tool.

BB30 Bottom Bracket Shell Reaming Tool #EE069 (available from FSA)



Park HTR-1 Handle and #750 Cone (Sold separately, not available from FSA)



**BB30 Spare Parts:** FSA has made available small parts to help service BB30 systems. Dealers can order the BB30 Road & MTB Spare Parts Box (FSA#EE052). The Spare Parts Box includes many of the small parts needed to install and service BB30 systems such as crank-bolts, bearing covers, wave spring washers, and consumer lever bearing removal and installation tools.



### MS188 Spacers:

All aftermarket FSA BB30 road cranksets come with MS188 spacers. Spacers are not required during installation if the BB30 shell of the frame is within correct specifications. The shims are made available in anticipation of varying frame manufacturing capacities. If a BB30 crankset is installed properly on the bicycle and the crankset spindle moves side to side in the bearing (and wave spring washer isn't compressed), the MS188 spacers will take up the excess play. Because the MS188 spacers are necessary for frame specification issues and not crankset defects, MS188 spacers are not available as free of charge warranty replacements, but if needed can be ordered through normal distribution channels.



MS188 Spacers

## Troubleshooting BB30 Symptoms

The drawings with dimensions and tolerances for BB30 shells and bearings are available for download at [www.bb30standard.com](http://www.bb30standard.com). It is recommended to view and understand the dimensions and tolerances for the BB30 system. This understanding will go a long way toward troubleshooting and resolving issues quickly.

Symptom	Possibility	Check
Left arm will not draw onto spindle fully while tightening bolt	<ul style="list-style-type: none"> <li>• Too much friction between spindle and left arm</li> <li>• Not enough torque on crankbolt</li> </ul>	<ul style="list-style-type: none"> <li>• Apply a light amount of grease on spindle to help draw crank arm on.</li> <li>• Use calibrated torque wrench to tighten crankbolt to 45-55 Nm</li> </ul>
BB30 bearing feels okay when uninstalled but feels rough after being pressed into bottom bracket shell.	<ul style="list-style-type: none"> <li>• BB Shell ID undersized</li> <li>• BB30 bearing OD oversized</li> <li>• BB30 Bearing not installed square in shell</li> </ul>	<ul style="list-style-type: none"> <li>• Measure BB Shell ID, ream BB shell using EE069 tool if undersized.</li> <li>• Measure bearing OD, replace if oversized</li> <li>• Reinstall bearings with proper tooling to guarantee bearing alignment.</li> </ul>
Difficulty installing drive-side crank through bearings (as if spindle does not want to fit into bearing).	<ul style="list-style-type: none"> <li>• No grease on spindle</li> <li>• Bearings not aligned in BB Shell</li> <li>• Bearing ID undersized</li> <li>• Spindle OD Oversized</li> </ul>	<ul style="list-style-type: none"> <li>• Apply a light amount of grease to help install spindle through bearings</li> <li>• Remove and reinstall bearings with proper tooling to guarantee bearing alignment. (May need to ream BB shell to remove burrs and improve bearing seat concentricity).</li> <li>• Measure bearing ID, replace if undersized.</li> <li>• Measure Spindle OD, contact crank manufacture if suspect oversized OD.</li> </ul>
<p>A. Crank rotation poor after being installed but <b>before</b> crankbolt is tightened.</p> <p>B. Bearings feel good after installed into bottom bracket shell but feel poor after drive-side crank is installed through both bearings.</p>	<ul style="list-style-type: none"> <li>• Bearings not aligned in BB Shell</li> <li>• Bearings not completely pressed into frame</li> <li>• Incorrect spindle spacer/ bearing cover combination</li> <li>• Bearing ID undersized</li> <li>• Spindle bearing seats OD oversized.</li> </ul>	<ul style="list-style-type: none"> <li>• Remove and reinstall bearings with proper tooling to guarantee bearing alignment (May need to ream BB shell to remove burrs and improve bearing seat concentricity).</li> <li>• Use proper tooling to press bearings into frame completely.</li> <li>• Consult installation instructions/ diagrams and install spindle spacer or bearing covers in correct combination and orientation.</li> <li>• Measure bearing ID, replace if undersized.</li> <li>• Measure Spindle OD, contact crank manufacture if suspect oversized OD.</li> </ul>
Play in crankset side to side after installation or after short use of crankset	<ul style="list-style-type: none"> <li>• Did not tighten crankbolt to torque specification.</li> <li>• Incorrect use/ combination of spindle spacers, bearing covers</li> <li>• Missing bearing covers or spacers (when applicable)</li> </ul>	<ul style="list-style-type: none"> <li>• Use calibrated torque wrench to tighten crankbolt within the torque specification written on the crankbolt.</li> <li>• Check instructions to make sure proper spindle spacers, bearing covers are being used for frame application (note ATB cranks have different spacers for 68 or 73mm shells).</li> <li>• Replace damaged or broken Wave spring Washer</li> <li>• Make sure cir-clips are installed correctly before pressing bearings into</li> </ul>



Full Speed Ahead

Play in crankset side to side after installation or after short use of crankset (continued).	<ul style="list-style-type: none"> <li>• Broken, damaged, or missing wave spring washer</li> <li>• Did not install cir-clips into frame before pressing bearings in shell.</li> <li>• Bearing Seats/ cir-clip location cut deeper into shell than specification</li> <li>• BB Shell width or C-clip spacing is undersized and not within specification.</li> </ul>	<p>shell.</p> <ul style="list-style-type: none"> <li>• Measure BB shell and C-clip position and compare to drawing found at <a href="http://www.bb30standard.com">www.bb30standard.com</a>. If Shell and C-clip position are out of specification contact frame manufacturer.</li> <li>• After measuring BB shell and C-clip position and determining the shell width or c-clip position is undersized, use MS188 spacers on spindles between bearings and crank arms to remove excess space.</li> </ul>
Crank binds, has poor rotation after crank arms are installed and crankbolt is tightened to recommended torque (wave spring washer compressed completely flat).	<ul style="list-style-type: none"> <li>• BB shell width and C-clip spacing is too wide and not within specification.</li> <li>• Bearings are not pressed completely into BB30 shell.</li> <li>• Torque Wrench is un-calibrated and crankbolt it tightened to incorrect torque.</li> </ul>	<ul style="list-style-type: none"> <li>• Measure BB shell and C-clip position and compare to drawing found at <a href="http://www.bb30standard.com">www.bb30standard.com</a>. If Shell and C-clip position are out of specification contact frame manufacturer.</li> <li>• Remove and reinstall BB30 Bearings to correct depth using the BB30 installation tools described earlier in this tech bulletin.</li> <li>• Remove and reinstall crank arm with properly calibrated torque wrench (<b>Note:</b> it is possible to over-tightened the crank arm on the spindle and over-size the aluminum insert of the left arm, this will cause the crank arm to fit loose on spindle and possibly come loose while riding. That is why it is crucial to use a calibrated torque wrench during the initial installation of the crankset).</li> </ul>
Crankset is Binding after installation and C-clips are deformed after bearing removal.	<ul style="list-style-type: none"> <li>• Bearings were pressed in with too much force during installation.</li> <li>• Crankbolt was over-tightened.</li> </ul>	<ul style="list-style-type: none"> <li>• Replace c-clips (do not re-use deformed c-clips) and reinstall bearings correctly taking care not to create enough force to damage c-clips.</li> <li>• Remove and reinstall crankset with calibrated torque wrench. Tighten Crankbolt to 45-55 Nm. (<b>Note:</b> it is possible to over-tightened the crank arm on the spindle and over-size the aluminum insert of the left arm, this will cause the crank arm to fit loose on spindle and possibly come loose while riding. That is why it is crucial to use a calibrated torque wrench during the initial installation of the crankset).</li> </ul>
Creaking while pedaling	<ul style="list-style-type: none"> <li>• Dirt or contaminants between any two contacting parts</li> <li>• Dry of grease or lubrication in necessary locations.</li> <li>• Dirty or worn chain</li> <li>• Dirty or worn pedals</li> <li>• BB Shell Insert loose in frame (applies to carbon frames).</li> </ul>	<ul style="list-style-type: none"> <li>• Remove crankset and clean contact points: Pedal threads, chainring tabs, chainrings and chainring bolts, spindle splines and left arm insert splines, bearing contact surfaces, BB shell contact surfaces, and c-clip groove.</li> <li>• Remove crankbolt from left arm and clean threads, contact surfaces, and left arm insert splines.</li> <li>• Add light grease on all contact points</li> <li>• Use light bearing retaining compound between bearings and BB shell (loctite 641 or loctite 609).</li> <li>• Use Light or Medium thread locker on crankbolt threads.</li> </ul>



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Creaking while pedaling (continued).

- Dirty or worn pedal cleats (on clipless style pedals and shoes).

- Clean chain thoroughly or replace (always clean chainrings thoroughly along with this step).
- Clean pedals thoroughly, including threads and re-grease.
- Clean and re-grease pedal cleat, and cleat screws on shoes
- Contact frame manufacturer if BB Shell insert is suspected loose in carbon frame.

## BB30 to Standard English Adapter

FSA has internal sleeves that will convert a BB30 shell to a standard English thread, both 68 and 73mm widths, so standard crankset and bottom brackets can be used. FSA recommends using an Arbor press to press the BB30 to English thread adapter into the BB30 (refer to the adapter instructions found at [fullspeedahead.com](http://fullspeedahead.com)).

The BB shell Adapter is designed to **permanently** change the frame from BB30 standard to English thread. In rare cases, it is possible to remove the English thread adapter using the thread adapter remover tool. FSA does not recommend removing the adapter from carbon frames or frames with thin-walled BB shells once it has been installed. Removing the adapter can oversize the BB shell ID (inner diameter). Oversized BB shell ID's will be prone to creaking, potential bearing failure and irreparable frame damage (especially in carbon frames).

**M3 BB30 to Standard Mega Exo Bearings & Cups:** FSA is developing bottom bracket cups with bearings that will fit in a BB30 frame and allow the use of a late model Mega Exo Alloy or Carbon Light (K-Force Light, SL-K Light) series crankset. Mega Exo crankset and bottom brackets are for true 24mm diameter spindles of FSA cranksets only. Many other manufacturers use a spindle that is slightly smaller than 24mm are not compatible with FSA bottom brackets. The M3 Bottom Brackets will be available in both Standard and Ceramic Bearing late summer 2010.

BB30 to English Thread Adapter  
68mm width #B3119  
73mm width #B3122



BB30 Thread Adapter Removal Tool #EE039



M3 BB30 to Standard Mega Exo Bearings & Cups (available late summer)



FSA is committed to support our network of distributors, dealers, and end-users by providing information and updates in a professional and timely manner.